

Seagrass system's missing piece: the deep macerating bottoms. Pilot study of nematode community associated with Mediterranean *P. oceanica* detritus.

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Seagrass beds play a key role in the Mediterranean Sea, producing oxygen and absorbing carbon dioxide, they act as crucial coastal carbon sinks. Additionally, they represent spawning, settlement, nursery, and feeding habitats for many species across various trophic levels. The importance of *Posidonia oceanica* (L.) Delile beds in ecosystem functioning extends beyond the living beds, including also their dead components, mainly leaves shed seasonally and carried away from the original bed. Recently, supra-littoral deposits (known as 'banquettes'), have been investigated as part of the seagrass life cycle, in terms of their nutrients, biomass and associated community. Nevertheless, a fraction of the *Posidonia* detritus is widely overlooked, sinking to deeper seafloors instead of reaching the shore. This deep detrital compartment, mainly composed of sediment mixed with *P. oceanica* detritus, was described only once by Pères in 1953, who focused on the associated macrofauna. Here, we investigated for the first time the nematode community inhabiting sediments characterized by *P. oceanica* macrodetritus, discovered at 65-80 m depth off Ischia Island (Gulf of Naples, Italy). These macerating bottoms revealed a very high nematode biodiversity (31 families, 104 genera), with a clear prevalence of selective and non-selective deposit feeders, suggesting the key role of these habitats in the benthic detrital food web. The taxonomic and functional diversity of the nematode assemblages indicated a "good" to "moderate" ecological quality status. These findings support the high ecological value of macerating seagrass bottoms, an overlooked component of the blue carbon cycle that deserves to be further investigated.

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